

WHAT IS CLAIMED IS:

1. A subcompact modular ionic breath cleaner is a human body carrying air cleaner for reducing airborne substances in the air surrounding the user's face comprised of
 - A subcompact breath cleaner ionization module with an electrical input means;
 - 5 A main power supply module which provides power source for the said subcompact breath cleaner ionization module with an electrical output means;
 - A connecting cable with a first electrical coupling means at one end and a second electrical coupling means at the other end;
 - 10 The said first electrical coupling means of the said connecting cable is connected to the said input of the said subcompact breath cleaner ionization module;
 - The said second electrical coupling means of the said connecting cable is connected to the said output of the said main power supply module.
2. The apparatus of claim 1, wherein said the said subcompact breath cleaner ionization module is a
 - 15 portable human body carrying device that supplies electrical ionic charges to air molecules surrounding the face of the user when high voltage is supplied to the electrical input of the said compact breath cleaner ionization module comprised of
 - A housing enclosure with mechanical mounting means;
 - A conducting collector cover supported by the said housing enclosure;
 - 20 An encapsulated PCBA (printed circuit board assembly) which having an input and an output, is supported by the said housing enclosure;
 - A conducting collector element which is made of electrically conductive material having an input is supported by the said housing enclosure;
 - 25 A third electrical coupling means for receiving an electric potential from a high voltage source which is the said output of the said encapsulated PCBA;
 - An ionizing element comprising an electrically conductive material having needle-pointed ends for providing a high potential gradient to ionize particle components of a gas passing there-through said ionizing element being connected to the said third electrical coupling means to produce said high potential gradient when supplied with charge from a high voltage source through said third electrical coupling means.
 - 30 A fourth electrical coupling means which is the said electrical input means of the said subcompact breath cleaner ionization module, is electrically connected to the said input of the encapsulated PCBA and is supported by the said housing enclosure;
 - A slot opening allows air and ionic charges to travel freely between the said ionizing element and the outside ambient of the housing enclosure;
 - 35 A mechanical coupling means assembled to the said mechanical mounting means of the said housing enclosure to provide carrying means of the said subcompact breath cleaner ionization

module for the said user.

3. The apparatus of claim 2, wherein said the said encapsulated PCBA comprises of a PCBA
encapsulated in encapsulation resin to allow the spaces between components to be smaller and will
not be electrically shorted.
4. The apparatus of claim 3, wherein said the encapsulation protects the PCBA from shorting due to
foreign conductive matters, which includes conductive fluid, metal and solid with conductive
surfaces.
5. The apparatus of claim 3, wherein said the method of using encapsulation with encapsulation resin
process on the components of the PCBA of a compact breath cleaner ionization module.
6. The apparatus of claim 3, wherein said the said encapsulation resin is a plastic material which can be
injection molded.
7. The apparatus of claim 3, wherein said the said encapsulation resin is a carbon base material.
8. The apparatus of claim 3, wherein said the said encapsulation resin is a silicon base material.
9. The apparatus of claim 3, wherein said the said PCBA utilizes surface mount technology (SMT)
components to minimize the physical size of the said PCBA.
10. The apparatus of claim 9, wherein said the method of utilizing surface mount technology (SMT)
components to minimize the physical size of the PCBA of a subcompact breath cleaner ionization
module.
11. The apparatus of claim 3, wherein said the said PCBA utilizes chip on board technology components
to minimize the physical size of the said PCBA.
12. The apparatus of claim 11, wherein said the method of utilizing chip on board technology components
to minimize the physical size of the PCBA of a subcompact breath cleaner ionization module.
13. The apparatus of claim 3, wherein said the said PCBA comprises of electronic components which
provide voltage multiplier functions having an input and an output with the said output forms an
output of high voltage power supply to the said ionizing element to ionize particle components of a
gas passing there-through the said ionizing element when the said input is supplied with a high

oscillating voltage.

14. The apparatus of claim 13, wherein said the said voltage multiplier functions magnify the input voltage by at least 50% at the said output.

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15. The apparatus of claim 13, wherein said the said output of high voltage power supply to the said ionizing element is at least 5000 volt.

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16. The apparatus of claim 2, wherein said the said conductive collector element attracts the airborne charged matters introduced by the said ionization process with the said input of the said conductive collector element is connected to a source with opposite electrically charged with reference to the electrical polarity of the said ionizing element.

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17. The apparatus of claim 16, wherein said the method of using a conductive collector element to attract airborne charged matters introduced by ionization process with the said input of the said conductive collector element is connected to a source with opposite electrically charged with reference to the electrical polarity of the said ionizing element, in a subcompact breath cleaner ionization module.

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18. The apparatus of claim 2, wherein said the said ionizing element generates positive ionic charges.

19. The apparatus of claim 2, wherein said the said ionizing element generates negative ionic charges.

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20. The apparatus of claim 1, wherein said the said conductor cable has a section of the cable processed into coil form.

21. The apparatus of claim 2, wherein said the said fourth electrical coupling means is a quick disconnect connector which is defined as disconnecting process without requirement of removal of mechanical fastener.

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22. The apparatus of claim 2, wherein said the said electrically conductive material having needle-pointed ends may be substituted with conductive metal-coated fine non-metallic filaments.

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23. The apparatus of claim 2, wherein said the method of using an ionizing element in a human body carrying subcompact breath cleaner ionization module to ionize particle components of a gas passing there-through the said ionizing element.

24. The apparatus of claim 23, wherein said the said ionizing element generates positive ionic charges.

25. The apparatus of claim 23, wherein said the said ionizing element generates negative ionic charges.
26. The apparatus of claim 1, wherein said the said main power supply module of a subcompact modular ionic breath cleaner which supplies high voltage source to the said subcompact breath cleaner ionization module to ionize particle components of a gas passing there-through the ionizing element of the said subcompact breath cleaner ionization module is comprised of
- A housing enclosure;
 - A belt mounting mechanism support by the said housing enclosure for user's belt mounting;
 - A battery holder having an output and is supported by the said housing provides space for the battery as the power source for the said subcompact modular ionic breath cleaner;
 - A PCBA (printed circuit board assembly) having an input and an output with the said input connected to the said output of the said battery holder is functioned to transform the said battery power into high voltage source at the said output;
 - A fifth electrical coupling means connected to the said output of the said PCBA for accepting the said second electrical coupling means of the said connecting cable for the transmission of electric potential energy all the way to the said input of the subcompact breath cleaner ionization module;
 - A power on-off switch;
 - A sixth electrical coupling means connected to the said PCBA and serves as the receptacle for external power supply;
 - An indicating means connected to the said PCBA and supported by the said housing enclosure for the indication of the power status of the system.
27. The apparatus of claim 26, wherein said the said PCBA of the said power supply module of a subcompact modular ionic breath cleaner comprises:
- A direct current DC power supply stage;
 - An oscillator stage powered by said direct current power supply;
 - A step-up transformer having a primary and at least one secondary winding, said primary winding forming an output of said oscillator stage;
 - The said output of the said oscillator stage is the said output of the said power supply module.
28. The apparatus of claim 27 wherein said the method of using an oscillator circuit to convert a DC power source into a pulsating/oscillating DC power source as the input power source to a step-up transformer circuit of a high voltage power supply source of a power supply module of a subcompact modular ionic breath cleaner.

29. The apparatus of claim 27 wherein said the method of using a step-up transformer with at least one primary winding and at least one secondary winding to transform a pulsating/oscillating DC power source input to a higher voltage output of a high voltage power supply source of a power supply module of a subcompact modular ionic breath cleaner.

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30. The apparatus of claim 13 wherein said the method of using a voltage multiplier circuit to multiply the input voltage of an oscillating voltage to a high voltage output as a high voltage power supply source of an ionization process of a subcompact breath cleaner ionization module.

The voltage multiplier circuit is defined as using multiple stages of capacitor and diode cascade circuit to increase the said input voltage to an output voltage of at least 1 time of the said input voltage potential.

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31. The apparatus of claim 13 wherein said the electronic components of the said voltage multiplier PCBA are encapsulated in encapsulation resin to allow the spaces between components to be smaller and will not be electrically shorted.

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32. The apparatus of claim 31 wherein said the method of using encapsulation with encapsulation resin process on the components of the PCBA of a subcompact breath cleaner ionization module of a subcompact modular ionic breath cleaner.

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33. The apparatus of claim 2 wherein said the mechanical coupling means is a neck strap for hanging the said subcompact breath cleaner ionization module to the front of the user's body by wearing the said neck strap around the user's neck.

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34. The apparatus of claim 33 wherein said the neck strap is a soft and flexible object.

35. The apparatus of claim 2 wherein said the mechanical coupling means is a mechanical clip for mounting the said subcompact breath cleaner ionization module to the front of the user's body by clipping the said mechanical clip to the cloth of the user.

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36. The apparatus of claim 1, wherein said the said subcompact breath cleaner ionization module is a portable human body carrying device that supplies electrical ionic charges to air molecules surrounding the face of the user when high voltage is supplied to the electrical input of the said compact breath cleaner ionization module comprised of

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A housing enclosure with mechanical mounting means;

A conducting collector cover supported by the said housing enclosure;

A conducting collector element which is made of electrically conductive material having an

input is supported by the said housing enclosure;

A seventh electrical coupling means for receiving an electric potential from a high voltage source which is the input of the said subcompact breath cleaner ionization module;

An ionizing element comprising an electrically conductive material having needle-pointed ends for providing a high potential gradient to ionize particle components of a gas passing there-through said ionizing element being connected to the said seventh electrical coupling means to produce said high potential gradient when supplied with charge from a high voltage source through said seventh electrical coupling means.

A slot opening allows air and ionic charges to travel freely between the said ionizing element and the outside ambient of the housing enclosure;

A mechanical coupling means assembled to the said mechanical mounting means of the said housing enclosure to provide carrying means of the said subcompact breath cleaner ionization module for the said user.

37. The apparatus of claim 36, wherein said the said conductive collector element attracts the airborne charged matters introduced by the said ionization process with the said input of the said conductive collector element is connected to a source with opposite electrically charged with reference to the electrical polarity of the said ionizing element.

38. The apparatus of claim 37, wherein said the method of using a conductive collector element to attract airborne charged matters introduced by ionization process with the said input of the said conductive collector element is connected to a source with opposite electrically charged with reference to the electrical polarity of the said ionizing element, in a subcompact breath cleaner ionization module.

39. The apparatus of claim 36, wherein said the said ionizing element generates positive ionic charges.

40. The apparatus of claim 36, wherein said the said ionizing element generates negative ionic charges.

41. The apparatus of claim 36, wherein said the said seventh electrical coupling means is a quick disconnect connector which is defined as disconnecting process without requirement of removal of mechanical fastener.

42. The apparatus of claim 36, wherein said the said electrically conductive material having needle-pointed ends may be substituted with conductive metal-coated fine non-metallic filaments.

43. The apparatus of claim 36, wherein said the method of using an ionizing element in a human body carrying subcompact breath cleaner ionization module to ionize particle components of a gas passing

there-through the said ionizing element.

44. The apparatus of claim 43, wherein said the said ionizing element generates positive ionic charges.

5 45. The apparatus of claim 43, wherein said the said ionizing element generates negative ionic charges.

46. The apparatus of claim 1, wherein said the said main power supply module of a subcompact modular ionic breath cleaner which supplies high voltage source to the said subcompact breath cleaner ionization module to ionize particle components of a gas passing there-through the ionizing element
10 of the said subcompact breath cleaner ionization module is comprised of

A housing enclosure;

A belt mounting mechanism support by the said housing enclosure for user's belt mounting;

A battery holder having an output and is supported by the said housing provides space for the battery as the power source for the said subcompact modular ionic breath cleaner;

15 A PCBA (printed circuit board assembly) having an input and an output with the said input connected to the said output of the said battery holder is functioned to transform the said battery power into high voltage source at the said output;

An eighth electrical coupling means connected to the said output of the said PCBA for accepting the said second electrical coupling means of the said connecting cable for the
20 transmission of electric potential energy all the way to the said input of the subcompact breath cleaner ionization module;

A power on-off switch;

A ninth electrical coupling means connected to the said PCBA and serves as the receptacle for external power supply;

25 An indicating means connected to the said PCBA and supported by the said housing enclosure for the indication of the power status of the system.

47. The apparatus of claim 46, wherein said the said PCBA of the said power supply module of a subcompact modular ionic breath cleaner comprises:

30 A direct current DC power supply stage;

An oscillator stage powered by said direct current power supply;

A step-up transformer having a primary and at least one secondary winding, said primary winding forming an output of said oscillator stage;

35 A voltage multiplier stage having an input and an output with the said input of the said voltage multiplier being connected to the output of the oscillator stage; and the said output of the said voltage multiplier forms an output with high voltage power supply for supporting external device of a subcompact breath cleaner ionization module.

- 5 48. The apparatus of claim 47 wherein said the method of using an oscillator circuit to convert a DC power source into a pulsating/oscillating DC power source as the input power source to a step-up transformer circuit of a high voltage power supply source of a power supply module of a subcompact modular ionic breath cleaner.
- 10 49. The apparatus of claim 47 wherein said the method of using a step-up transformer with at least one primary winding and at least one secondary winding to transform a pulsating/oscillating DC power source input to a higher voltage output of a high voltage power supply source of a power supply module of a subcompact modular ionic breath cleaner.
- 15 50. The apparatus of claim 47 wherein said the method of using a voltage multiplier circuit to multiply the input voltage generated by the said step-up transformer to a high voltage output of a high voltage power supply source of a power supply module of a subcompact modular ionic breath cleaner.
 The voltage multiplier circuit is defined as using multiple stages of capacitor and diode cascade circuit to increase the said input voltage to an output voltage of at least 1 time of the said input voltage potential.
- 20 51. The apparatus of claim 47 wherein said the electronic components of the said voltage multiplier PCBA are encapsulated in encapsulation resin to allow the spaces between components to be smaller and will not be electrically shorted.
- 25 52. The apparatus of claim 51 wherein said the method of using encapsulation with encapsulation resin process on the components of the PCBA of a power supply module of a subcompact modular ionic breath cleaner.
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